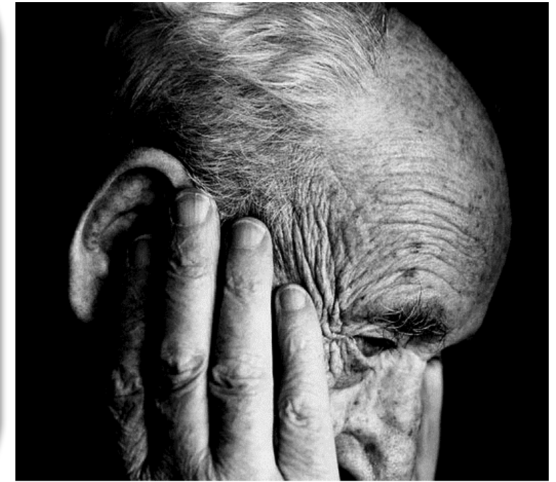




Draw Pharmacology

*in
your
mind*



Alzheimer's disease



If you are a pharmacy student
If you are postgraduate and want
to revise pharmacology by an
easy way

If you are using any pharmacology
reference

this file will aid you

> And wait for more <

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لا تنسوني من صالح دعائكم

Pharmacist. Alaa Nasr

د. آلاء نصر

VISIT...

LANZAROTE
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Alzheimer's disease

- It is an **irreversible** neurodegenerative disorder that was first described by → german psychiatrist and neuropathologist Alois Alzheimer in 1906
- Neurons** in the brain regions involved in **learning and memory processes** are affected by **degeneration** → **stop functioning** → so, this disease causes problems with **memory, thinking and behavior** → and it is the most common cause for **dementia** العته/النسيان → **and it gets worse by time**

- Notice that..** It is **NOT** a normal part of aging (many old people have a strong memory and mental activity)

Symptoms

- Forgetfulness النسيان (ex. to do something and then forgets that he has done it)
- Confusion تشوش ذهني (ex. talks → stops talking → and forgets what he was talking about)
- Memory loss (short-term memory "Hippocampus" is affected first then long-term memory)
- Getting lost in familiar places (ex. getting lost in the place he used to work in for years!)
- Troubles with language (ex. he forgets words)
- Difficulty in performing familiar tasks (ex. can not do what he used to do)
- Disorientation of time and place (ex. thinks that for example 2pm is 7pm and so on, do not know where he is)
- Changing in personality (behaviors)
- Problems with thinking

Notice that.. while the disease **progresses** → the degeneration spreads to other regions in the brain till it reaches the respiratory center → respiratory failure → causing **death**

Types

Late onset form

- Most common form**
- Onset:** After age **60**
- Progression:** over **5-15 years**

Early onset form

- Onset:** age **40-50**
- Progression:** rapidly leading to death within **2-3 years**

Alzheimer's disease

Vs

Aging

- Forgets the whole experience (ex. driving)
- Rarely remembers later
- Gradually unable to follow written or spoken directions
- Gradually unable to care for himself

- Could forget a part of an experience
- Often remembers later
- Usually able to follow written or spoken directions
- Usually able to care for himself

Pathophysiology

Alzheimer's disease is characterized by the development of

1. Amyloid deposits (Senile plaques)

Abnormal **clusters** of **protein fragments** called "**β-amyloid**" that build up in spaces between nerve cells

2. Neurofibrillary tangles

Abnormal **Intracellular accumulations** of **twisted fibrillary deposits** of the microtubule associated with protein that build up inside neurons

Note that.. Amyloid precursor protein → transmembrane protein that may normally function in the regulation of **synaptic plasticity** and cell survival

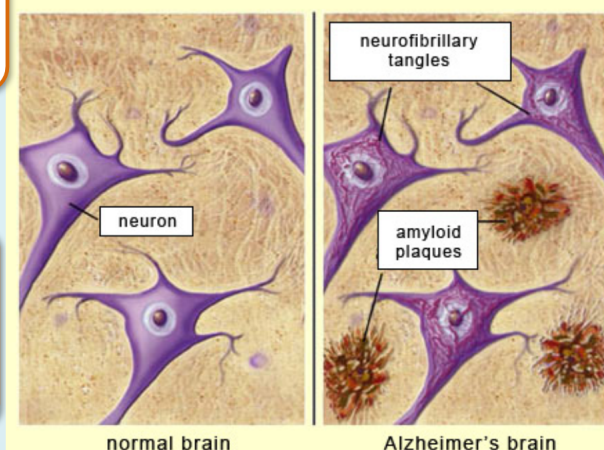
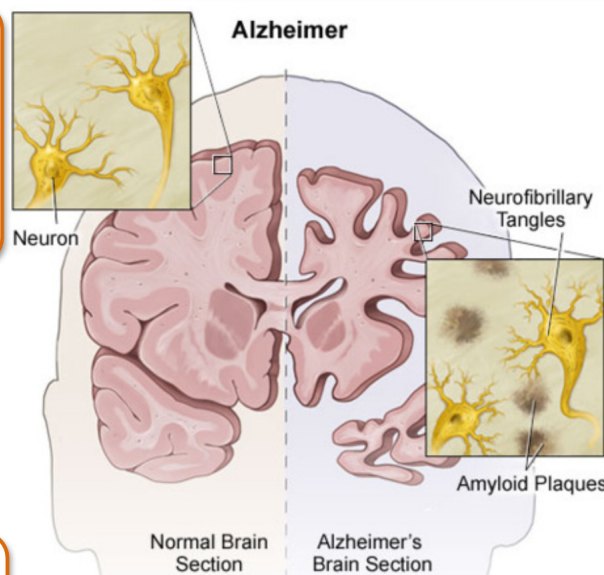
Parts affected in the brain

Hippocampus (short-term memory) and **Cortex**

Degeneration affects **cholinergic neurons** → ↓ **Ach level in Hippocampus and Cortex**

Risk factors

- Age
- Family history
- High blood pressure
- Head trauma
- Women > Men



Pharmacological treatment

As Alzheimer's disease is caused by an irreversible damage of neurons so there is no treatment can completely cure or protect the neurons, it is only **symptomatic treatment**

1. Acetylcholinesterase inhibitors

- Tacrine
- Donepezil
- Rivastigmine
- Galantamine

They inhibit acetylcholinesterase enzyme which break down Ach → ↑ **Ach** level in the brain



2. NMDA antagonists

- Memantine

Non-competitive NMDA receptor antagonist



Remember.. Glutamate (the substrate on NMDA receptor) → is a useful excitatory neurotransmitter in CNS but its excessive amount in CNS could lead to → "**Excitotoxicity**" (cell death) that may be involved in: Alzheimer's disease, Parkinson's disease, Multiple sclerosis

3. Supportive treatment

Vitamine E (Tocopherol) → an **antioxidant** → protecting against plaque formation in the brain



Brain Atrophy in Advanced Alzheimer's Disease

